

RAILWAY STORES SPECIFICATION FOR ROLLED STEEL BASE PLATE FOR 90(A) RAILS AND ELASTIC CLIPS

SCOPE

This specification covers the manufacture and test requirements for rolled steel base plates generally in accordance with British Standard 751:1959.

Manufacture shall be undertaken by firms certified to ISO 9001:2000/BS EN 9001:2000 or an equivalent International Quality Management System Standard acceptable to the purchaser to ensure overall quality of the product is maintained through out the product.

INTRODUCTION

Rolled Steel Base Plates form a bearing surface for the rail and provide housing to take rail clip. The base plates are fasten to a sleeper or other support by a secondary fastening system.

1. RAW MATERIALS

1.1 The steel shall be manufactured by any approved conventional method.

1.2 The mechanical properties of this steel shall be within the following limits, all tests are to be in accordance with BS 751 and BS 18:

1.2.1. ULTIMATE TENSILE STRENGTH

The ultimate tensile strength shall be not less than 410N/mm and not greater than 485 N/mm.

1.2.2. MINIMUM ELONGATION

The minimum elongation at fracture shall be 20%.

2. ROLLED STEEL BASE PLATES

2.1. Dimensional Accuracy:

The base plate shall conform to the dimension detailed in SLR Drawing No. 20607. The major dimensions as indicated in SLR Drawing No. 20607 shall be checked.

2.2. Identification:

The rolled steel base plates strip will be branded with the manufacturer's identification, the last two digits of the year of manufacture and the railways identification SLR and section of rail as indicated in SLR Drawing No. 20607. This

branding will be in raised characters on the top surface of the base plate outside the rail bearing area.

2.3 Surface Irregularities:

The base plates shall be cleanly rolled and sheared with the sheared faces perpendicular to the under surface of the base plate and the edges free from burrs. Holes shall be drilled or punched and shall have their bores perpendicular to the under surface of the base plate and shall be free from burrs. The base plates shall be free from harmful defects and irregularities.

3. SCHEDULE OF TESTS

3.1 Raw Materials:

The manufacturer shall submit with each batch of base plates a statement confirming the compliance of the material to the specification.

3.2 Base Plates Tests:

3.2.1 Mechanical Properties:

Test detailed in paragraph 1.2 will be carried out to confirm acceptability of the material. Tensile test pieces shall be cut lengthwise from bars or sheared base plates. The tensile test piece shall be of the dimensions specified in BS 751 and the test shall be performed in accordance with BS 18.

3.2.2 Dimensional Accuracy:

The dimensional accuracy of the base plates shall be checked with SLR Drawing No. 20607.

3.2.3 Finish:

The finish of the base plates shall be assessed visually based upon accepted pre-production base plates samples.

3.2.4 Production Samples:

Prior to the acceptance of bulk production, five samples base plates shall be submitted to SLR together with the result of physical tests on the material used. These base plates shall be inspected in accordance with this specification and if they conform they shall be suitably marked and they shall form the basis of the standard acceptable.

4. RESPONSIBILITY FOR TEST

4.1 The test details in this specification shall be carried out by the manufacturer or a mutually acceptable independent testing authority.

- 4.2 Records relating to the properties of the steel used for the production of the base plates and the physical testing of the material will be retained for assessment by the appointed inspector

5. FREQUENCY OF TESTS AND ACCEPTABILITY LEVELS

5.1 Physical Tests:

At least one series of physical tests shall be carried out on each cast of material or in the case of a continuous casting process from each four hour period of casting.

5.2 Dimensional Accuracy:

The base plates shall be inspected in batches of maximum of batch size of 50,000 Nos. to a normal single sampling plan as specified in British Standard 6001. Acceptable Quality Level 2.5 inspection level 1 with regard to significant dimension as indicate in SLR Drawing No. 20607. For a batch of 50,000 Nos. 200 Nos. samples shall be taken at random from the batch and the batch shall be rejected if 11 Nos. or more fail the test requirements.

5.3 Surface Irregularities:

The base plates shall be visually inspected for surface irregularities to BS 6001, acceptable quality level 2.5, inspection level 1. The base plates shall be free from warps greater than 1 mm (may be repressed) and shall be of a standard consistent with the pre-production samples.

6. ACCEPTABILITY OF BASE PLATES

- 6.1 Each production batch shall be accepted if the inspection samples meet the test requirements.

- 6.2 If the batch of base plates inspected fails to meet the test requirements retests may be agreed between the manufacturer and SLR to verify the batch quality.

7. RECORDS

All test and inspection records shall be retained by the manufacturer for a minimum of five years.

GENERAL SPECIFICATIONS FOR STEEL BOLTS & NUTS

1. SCOPE

This standard specifies the dimension and requirements for Bolts & Nuts to use with flat bottom rails.

2. MATERIALS

The steel shall conform to the requirements having property class 6.8 of table 3 (having tensile strength of 600N/mm²) and having chemical composition limits as per table 2 indicated in BSEN 20898-1-1992.

3. MANUFACTURE

Bolts & Nuts shall be produced by hot forging. Nut shall be hot forged. Welding is not permitted. Fasteners shall be clearly finished full in form and free from burrs and harmful defects.

4. HEAT TREATMENT

Fasteners may be supplied under full heat treated condition and details of the heat treatment shall be given in the manufacturer's certificate.

5. MECHANICAL PROPERTIES

After manufacture under heat treatment, a selected number of fasteners shall be tested to ascertain the mechanical properties of the batch. The sample or test pieces prepared there from shall not be subjected to additional heat treatment prior to testing. For acceptance purpose, all testes according to the table 5 of BSEN 20898-1-1992 test programme B shall be carried out.

5.1 BOLTS

5.1.1 Tensile test for full size Bolts.

The above shall be carried out as per Clause 8.2 of BSEN 208-1-1992.

5.1.2 Hardness test.

The above test shall be carried out as per Clause 8.3 of BSEN 20898-1-1992.

5.1.3 Proofing Load Test for full size Bolts.

The above test shall be carried out as per Clause 8.4 of BSEN 20898-1-1992.

5.1.4 Test for strength under wedge loading of full size Bolts.

The above test shall be carried out as per Clause 8.5 of BSEN 20898-1-1992. The fracture shall occur in the shank of thread of the Bolt and not between the head and the shank.

NUTS

Nuts shall conform and tested with BS EN 20898-2:1994 having property class 6.

DIMENSIONS

As per Drawing Nos. 20607, 18750/1, 22559, 16005 A and 21000 for Base Plates 90 (A) Lbs, Bridge Hook Bolts & Nuts, Switch Heel Bolts & Nuts 90 (A) Lbs, Stud Bolts & Nuts (Slide Chair Bolts & Nuts) and Coach Screws respectively.

SCREW THREAD

The thread form shall, unless otherwise specified by the purchaser conform to the medium class tolerance in accordance with BS 84.

As an alternative to the spanner test the bolts and nuts may be ordered to comply with the "Tight fit" tolerance specified in Clause 12 below and should be BSW thread as required by the purchaser.

GAUGING

Gauges used to establish compliance with dimensions and tolerance shall be included in the manufacturer's calibration system for periodic checking to confirm their accuracy and traceable to national standards.

QUALITY CONTROL

Option 1:

If the bidder is not a manufacturer, offer should be supported with a certificate from the manufacturer acceptable to Sri Lanka Railways giving the mode of manufacture and the physical and chemical properties of the materials before and after heat treatment. Bids not complying with above would be considered as unacceptable.

The manufacturer shall, as part of his quality control procedure, carry out sufficient inspections and tests to ensure that the specified requirement under BS 5750/ISO 9001:2008 are attained and maintained.

When sample plans are used in the selection of samples they shall be statistically viable.

The result of all inspections and tests shall be recorded and identified to the fasteners they represent and if required made available to the purchaser.

Option 2:

The inspection of all batches of bolts and nuts shall be undertaken by one of the following:-

- (a) The purchaser or their authorized inspectors shall inspect all batches of bolts and nuts ordered and witness any of the tests (see Clause 05), or
- (b) The application of quality assurance system (see the forward make reference to BS 5750/ISO 9001:2008 in the forward).

10. MARKINGS

Each bolt shall be marked on the head in embossed letter and with the trade (identification) mark of the manufacture, SLR and last two digit of the year of manufacture as per Clause 9 of BSEN 2089 - 1- 1992.

11. PROTECTIVE COATING

Before dispatch the finished fasteners shall be protected from atmospheric corrosion, under normal storage conditions by a protective medium. The head of all bolts shall be painted in red and a coat of linseed oil shall be applied for the items.

12. TOLERANCES

12.1 Tolerance on Nominal Length

Nominal Length		Tolerance on length
Over	Up to and including	
mm	mm	mm
30	50	±1.25
50	80	±1.50
80	120	±1.75
120	180	±2.00
180	250	±2.30
250	315	±2.60
315	400	±2.85
400	500	±3.15

12.2 Tolerance on unthreaded shank

Diameter

19mm to 24mm	$\pm 0.4\text{mm}$
24mm to 26mm	$\pm 0.4\text{mm}$

12.3 Tolerance for washers diameter (mm)

Diameter of the bolt (mm)	Interior diameter of the Washer (mm) Allowable tolerance	Quarter diameter of the Washer (mm) Allowable tolerance
19 mm	± 0.2	± 0.75
22 mm	± 0.2	± 0.75
24 mm	± 0.2	± 0.75
26 mm	± 0.2	± 0.75

12.4 Allowable tolerance for thickness of washers

Diameter of the bolt (mm)	Allowable tolerance
19 mm to 24 mm	± 0.2
22 mm to 26 mm	± 0.2

12.5 Tolerance of Hexagon Nuts

Dimensions in millimeter

Nominal size and thread diameter	Width Across Flats	Width across Corners	Thickness of Nut	Tolerance on squareness
19 mm	± 0.5	± 1.0	± 0.65	0.61
22 mm	± 0.5	± 1.0	± 0.65	0.61
24 mm	± 0.5	± 1.01	± 0.65	0.70
26 mm	± 0.5	± 1.3	± 0.65	0.78

12.3 Pitch of Thread (for metric thread)

Nominal size and thread diameter	Pitch of thread (coarse pitch series)
19 mm	2.5
22 mm	2.5
24 mm	3.0

13. TIGHTENING OF NUTS TO BOLTS

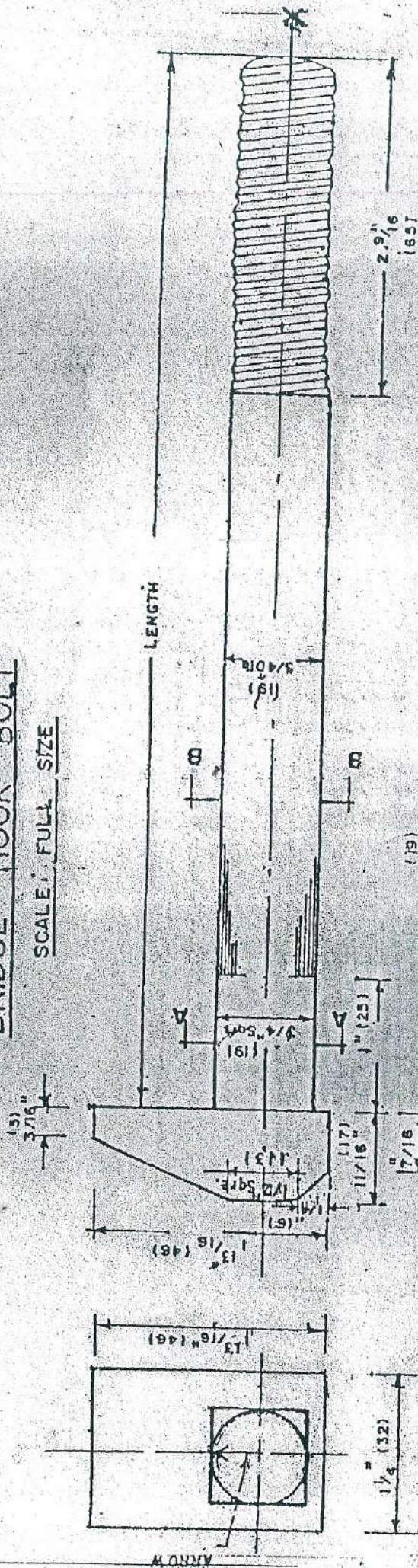
Nuts of all bolts shall be fixed (tighten) to half length (middle of the thread) of thread of the bolts before commencing packing for dispatch. Tightening of nuts should be done only with a prescribed spanner.

PLAN N° 18750/1

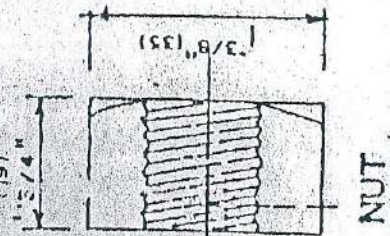
S. L. R.

BRIDGE HOOK BOLT

SCALE: FULL SIZE



BOLT

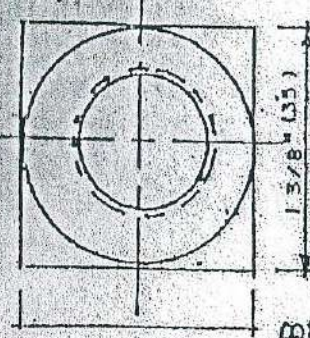


NUT

ELEVATION FROM X



SECTION A-A SECTION B-B

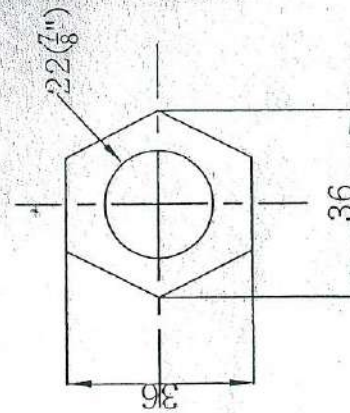
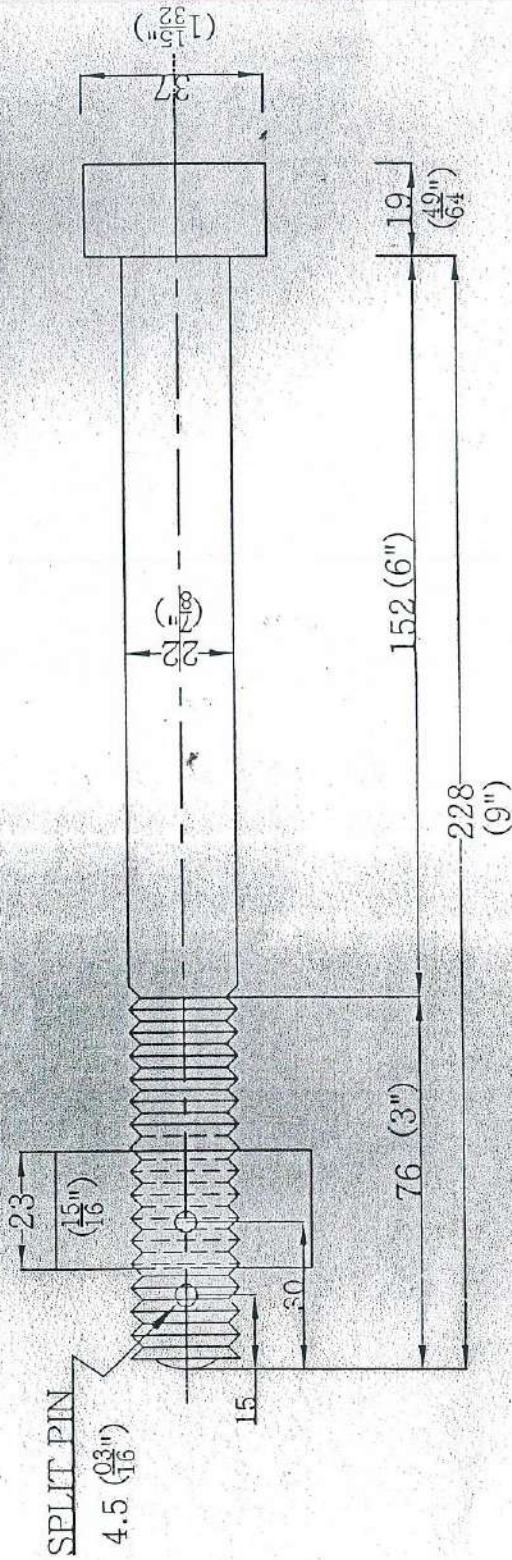


NOTE: MILLIMETRE DIMENSIONS SHOWN IN PARENTHESES

ALL DIMENSIONS ARE SAME FOR VARIOUS LENGTHS OF BOLTS

DRAWN BY	SRI LANKA RAILWAYS
TRACED BY	WAY & WORKS DEPT.
CHECKED BY	PLAN N° 18750/1
	DATE: 2003/10/30
	J. <i>[Signature]</i> CHIEF ENGINEER

SWITCH HEEL BOLT FOR 90 LBS RAILS SCALE : NOT TO SCALE



THREAD DETAILS
MEDIUM TOLERANCE
CONFORMING TO BS 84

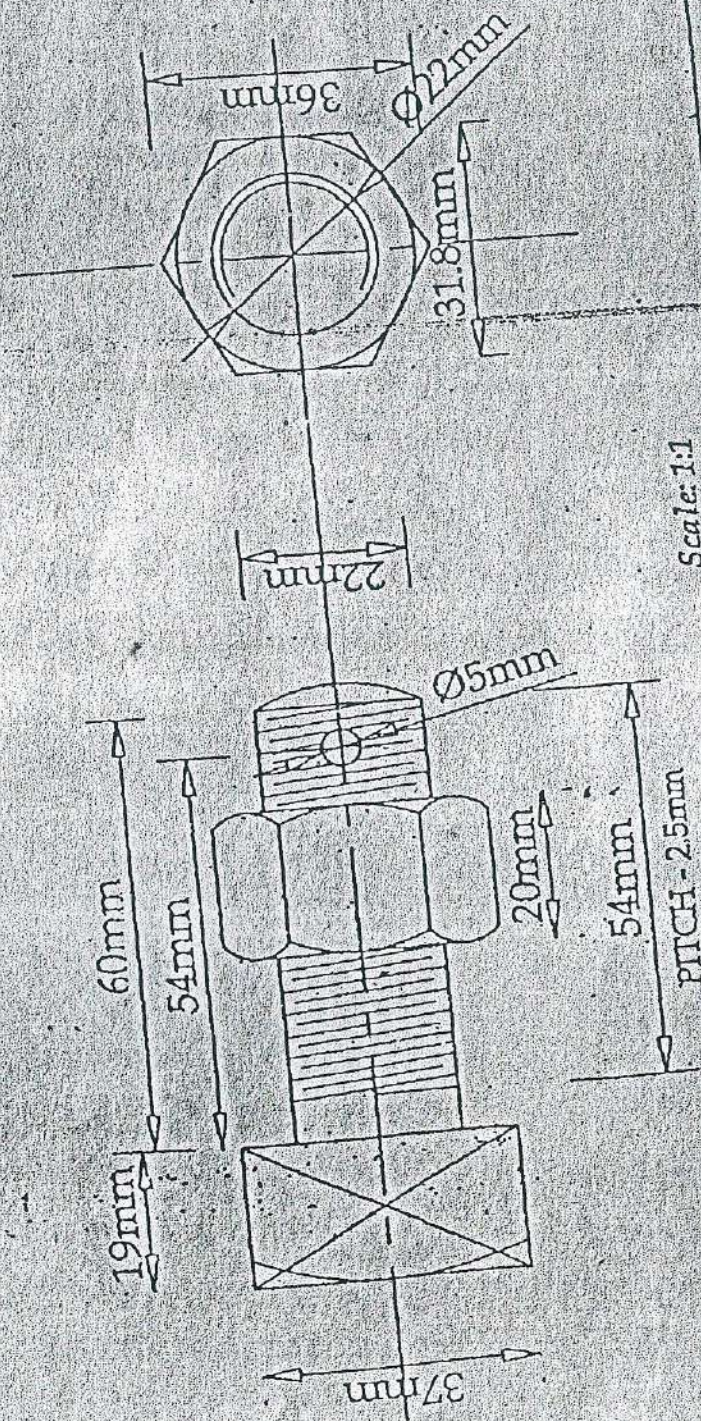
NUT

DRAWN BY: 	SRI LANKA RAILWAYS		
CHECKED BY: 	WAY & WORKS DEPT		
D.O.A 	DRG. NO: 22559	EST. NO:	
D.E 	DATE:		
APPROVED 	 CHIEF ENGINEER		

Dr. No. 16005A

Amended on 27.12.2007

F.S.D. OF TURN SLIDE CHAIR BOLT. (80/88 LBS. RAILS.)



Scale: 1:1

SRI LANKA RAILWAYS
Way & Works Department

Drawn By:
J.S.D.

Date: 27.12.2007

Checked By:
J.H.D.

Dr. No. 16005A

Date:

DOA:

J.H.D.

Approved By:

CHIEF ENGINEER

